

# Behaviors and Down syndrome

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# Objectives

- ✓ Understand areas of the brain that impact behaviors
- ✓ Connect brain differences to expression of these differences in day to day life
- ✓ Learn to look at behaviors analytically
- ✓ Identify strategies and interventions to address challenging behaviors

# Brains of Individuals with Down syndrome

- ▶ At or just before birth, the brain of an individual with Down syndrome is almost indistinguishable from the brain of individuals without any genetic anomalies
- ▶ Neuropathological differences begin to show after 3–5 months of age and demonstrate definite differences by 6 months.
- ▶ Once mature, the brains of people with Down syndrome are about 20% smaller than average and have fewer neurons, as well as abnormal connections between cells.

## Areas of the Brain that are Effected

- ▶ Areas of the brain that seem to have differences in volume or circuitry include:
  - **Hippocampus** which is responsible for memory and learning
  - **Prefrontal Cortex** responsible for higher level cognitive tasks such as planning, decision making, problem solving, personality expression, modulation of social behaviors, inhibition, etc.
  - **Cerebellum** responsible for coordination of movement and learning, as well as attention and language.

# Probabilistic Behavioral Phenotype

- ▶ More likely to show one or more of these characteristics or behaviors, but this does not mean every child will display these characteristics or behaviors.

# Expression of these Brain Differences

## ▶ Relative Strengths

- Intact implicit memory (procedural): Routines, schedules
- Visuospatial memory: Where things are placed
- Visual processing: Being able to “read the room”
- Visual-motor integration: Being able to follow models
- Receptive language skills: Understanding of what someone communicates to them
- Social-emotional functioning (intact social relatedness, social competence, nonverbal social functioning): Interested and motivated by others
- Visual imitation: Watching and imitating

# Impact of Brain Differences

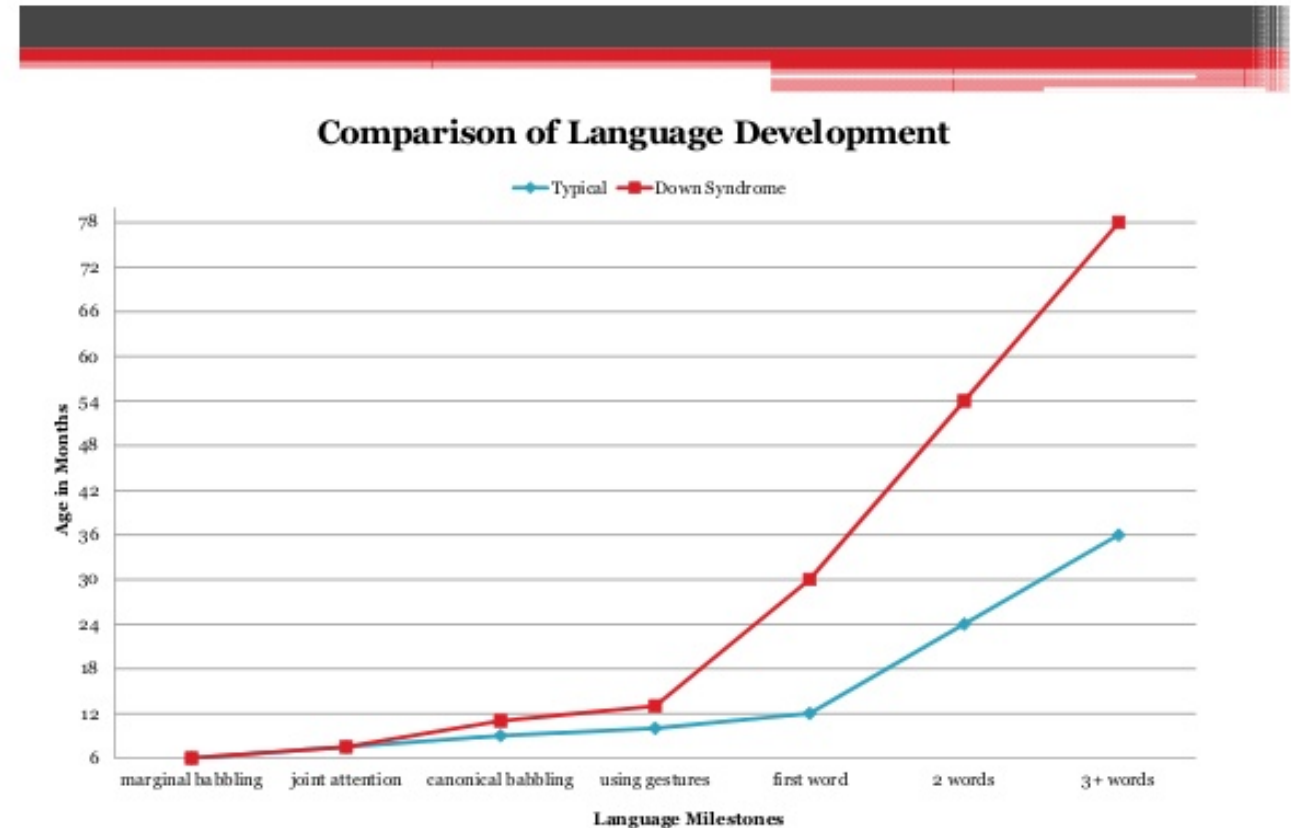
## ► Challenges

- Problems with explicit memory: Facts and events
- Poor auditory and verbal working memory: Hearing something and then remembering what was said
- Verbal processing: Following directions verbally stated
- Slower motor coordination and response time: Being given an instruction, starting to follow through
- Expressive language skills: Verbalizing
- Problem solving: Determining how to solve a problem differently
- Persistence and motivation of challenging tasks: Giving up



# Neurological Differences + Typical Changes

- ▶ Children with Down syndrome still go through the typical stages of development on top of having these neurological differences. In the research world, this is a “developmental approach”.



## Setting Events Checklist

Student: _____ Respondent: _____				
Behavior Interest: _____ Date: _____				
<p><b>Instructions:</b> The list below includes events that could possibly increase the likelihood of problem behavior occurring. If an event contributes to the student's behavior, check the appropriate column to indicate when the event occurs in relation to when it contributes to the problem behavior. For longstanding influences, note only those that contribute to the current incident or behavior.</p>				
SETTING EVENT (by type)	Same Day	Day Before	Within Week	Long Standing
<b>Physical</b>				
Meal time change or meal missed				
Sleep pattern (including duration) atypical				
Medications changed or missed				
Appeared or complained of illness				
Appeared or complained of pain or discomfort				
Allergy Symptoms				
Seizure				
Chronic health condition				
Other (specify):				

Additional  
Setting  
Events

# How Does This Knowledge Intersect with Behavior?

- ▶ Higher demand versus ability to cope
- ▶ Chronic higher state of anxiety (fight or flight) due to incomplete data
- ▶ Higher frequency of behaviors due to higher rate of exhaustion on internal resources
- ▶ More likely to engage in distraction strategies when tasks are too difficult or un motivating
- ▶ Less motivation to show what you know
- ▶ Highly rewarded by social attention compared to everything else
- ▶ **Challenging Behaviors=Communication of a mismatch between the child and something in their environment.**

So What?

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Behaviors occur with the context of a situation, but also occur within the context of neurodevelopment and chronic issues. Understanding that better prepares us to find a more meaningful solution.

# Function



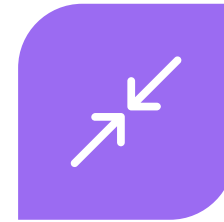
IMPULSIVE  
HITTING



THROWING



WAITING



RESISTANCE  
TO CHANGE



SAFETY

# Common Functions of Behavior

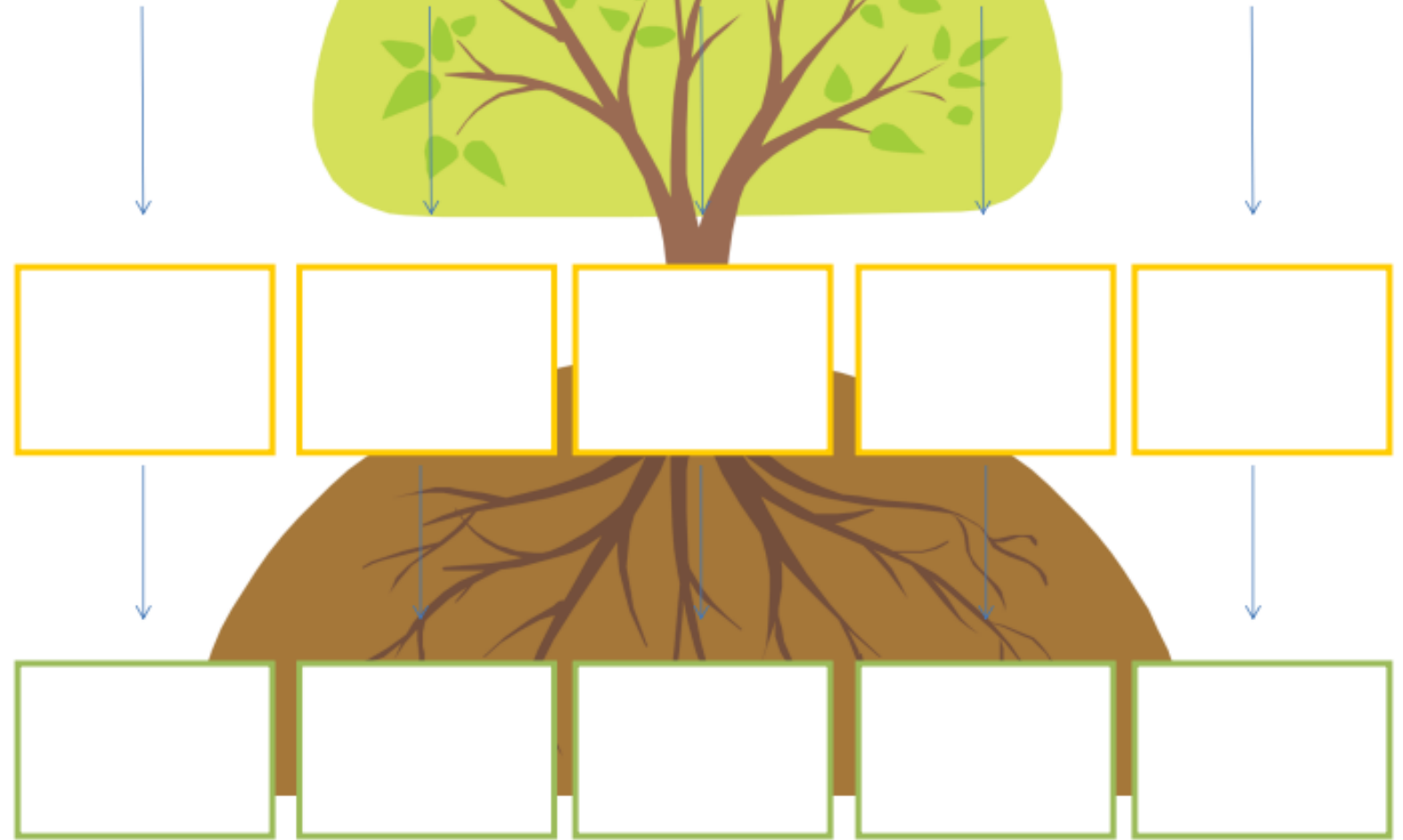
**Social Attention:** A person may engage in a certain behaviour to gain some form of social attention or a reaction from other people. For example, a child might engage in a behaviour to get other people to look at them, laugh at them, play with them, hug them or scold them.

**Tangibles or Activities:** Some behaviours occur so the person can obtain a tangible item or gain access to a desired activity. For example, someone might scream and shout until their parents buy them a new toy (tangible item) or bring them to the zoo (activity).

**Escape or Avoidance:** Not all behaviours occur so the person can “obtain” something; many behaviours occur because the person wants to get away from something or avoid something altogether (Miltenberger, 2008).

**Sensory Stimulation:** The function of some behaviours do not rely on anything external to the person and instead are internally pleasing in some way.

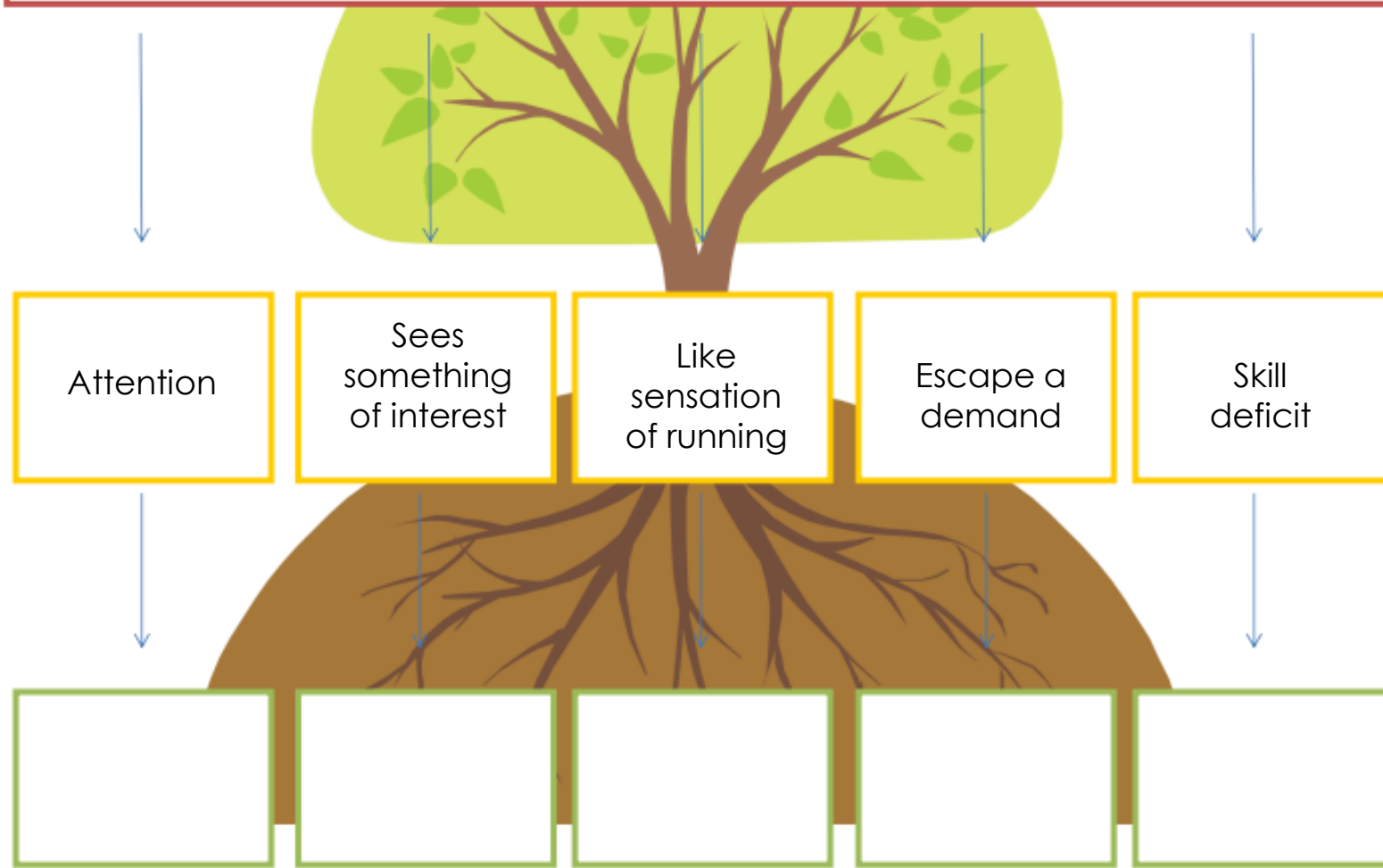
**Observed Behavior**



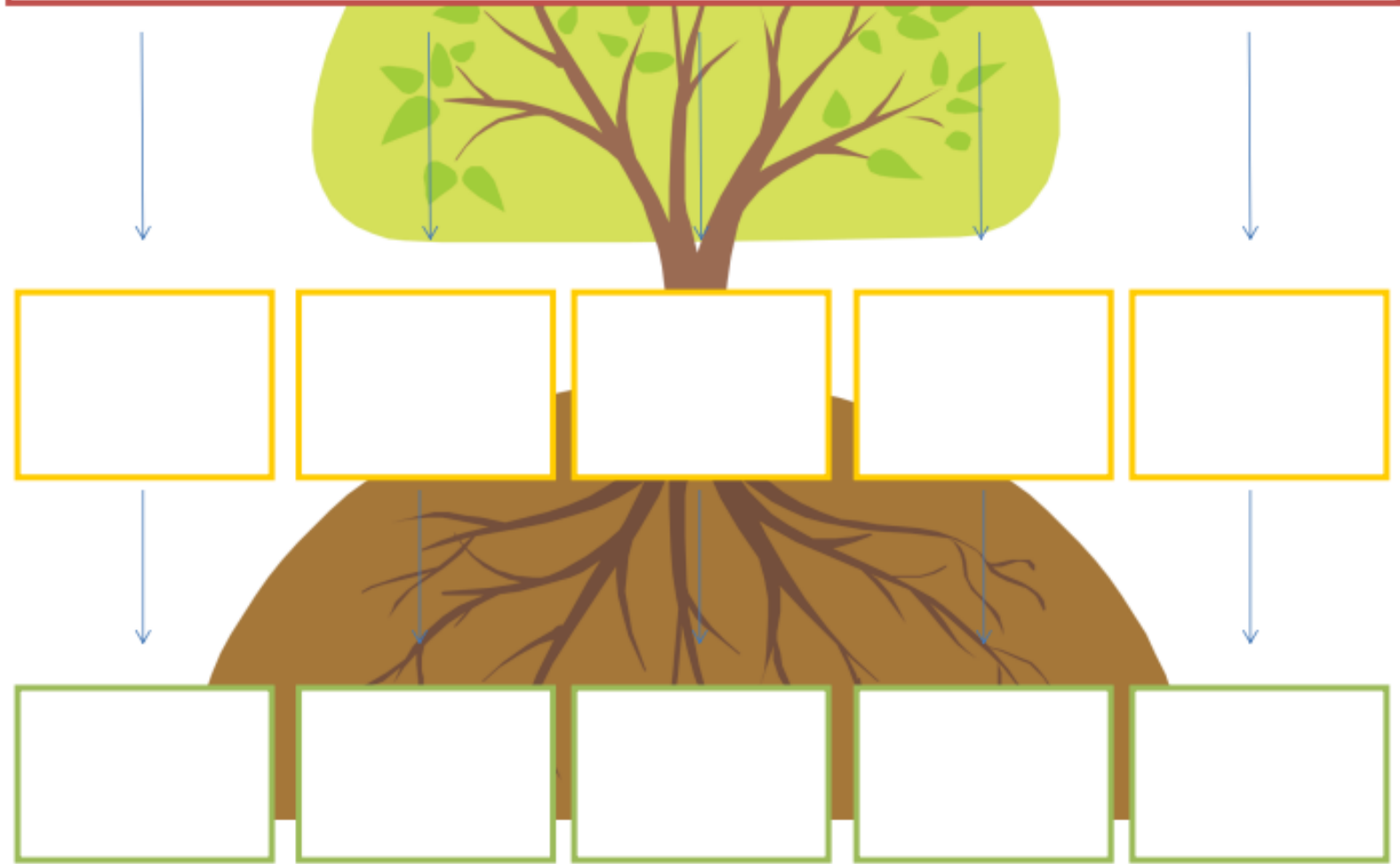


**Observed Behavior**

Runs from adults and looks back and laughs



**Observed Behavior**





wash



toilet



get dressed



breakfast



brush teeth



bath



pajamas



milk



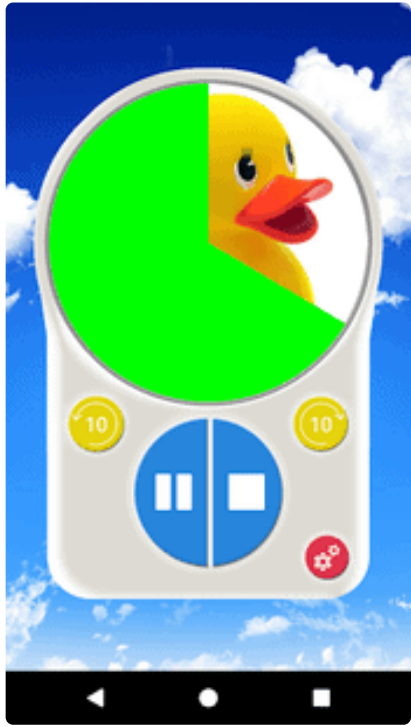
story



bedtime

# Visual Schedules





# Timers



A token board for a zoo theme. At the top is an illustration of a zoo entrance with a sign that says "ZOO" and various animals like a monkey, giraffe, lion, elephant, and hippo. Below the illustration is a row of five empty white boxes. Underneath these boxes is a grey bar with the text "I am working for..." followed by a larger empty white box. At the bottom, there is a row of five small icons: a giraffe, an elephant, a hippo, a monkey, and a lion.

Princesses use  
Kind words  
Safe Hands



A token board for a princess theme. At the top is the text "Princesses use Kind words Safe Hands". Below the text is an illustration of a group of ten Disney princesses in their signature dresses. Underneath the illustration is a row of five empty white boxes. Below these boxes is a blue bar with the text "I am working for..." followed by a larger empty white box.

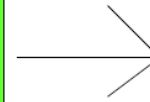
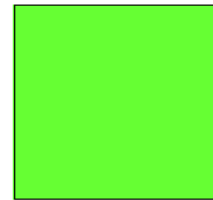
# Token boards

# Emotion Regulation

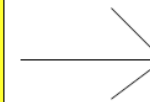
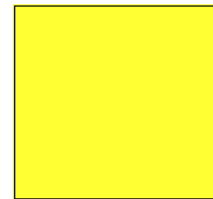
## How to Show I'm Calm



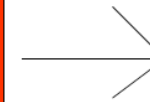
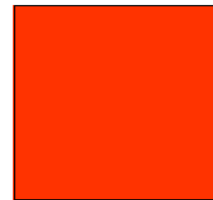
	<p>Sit</p>
	<p>Show safe hands</p>
	<p>Deep belly breaths</p>
	<p>Use your words</p>



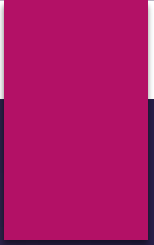
happy	share with friends	safe body	make good choices
safe walking	listen	play with friends	keep things safe



upset	don't have safe body	don't share with friends
don't listen	drop	don't make good choices



mad	scream	run away	don't listen
hit	kick	mess up work	throw



“ The important point is that difficult behaviors do not occur by accident, or because someone has a disability. Difficult behaviors are expressions of real and legitimate needs. All behavior, even if it is self-destructive, is “meaning-full”.

David Pitonyak, PhD  
Blacksburg, VA  
Down Syndrome News

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